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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/810,962	03/16/2001	Atsuo Omaru	09792909-4809	7248

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EXAMINER	
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ART UNIT	PAPER NUMBER
1745	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/810,962	OMARU ET AL.	
	Examiner	Art Unit	
	Tracy Dove	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 June 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-5 and 15-46* is/are pending in the application.

4a) Of the above claim(s) *15-46* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-5* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/27/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the communication filed on 6/12/07. Applicant's arguments have been considered, but are not persuasive. Claims 1, 3-5 and 15-46 are pending with claims 15-46 being withdrawn.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 2/27/07 has been considered by the examiner.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/12/07 has been entered.

Claims Analysis

The claimed invention recites the graphite in the negative electrode has a "rhombohedral structure". The specification discloses that natural graphite has a "rhombohedral structure" (page 21) and that natural graphite having a "rhombohedral structure" may be used as a starting material (page 42). Thus, in view of the teaching of the present specification, natural graphite contains a "rhombohedral structure".

The claimed invention recites "said graphite material comprises graphite and a component other than graphite" and "the weight reduction as measured by DTG, is at least 5% and at most 40%", which are not given patentable weight because the limitations are product-by-

process limitations. Product-by-process limitations, in the absence of unexpected results, are not given patentable weight. The component other than graphite does not appear to be present in the produced negative electrode graphite material.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1 and 3-5 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1 and 3-5 contain the limitation "said graphite material is characterized by...the weight reduction as measured by DTG and is at least 5% and at most 40%" which contains new matter. Page 11 of the specification discloses "the proportion of weight reduction due to the component *other than* the graphite inside the particles, which can be obtained by the DTG curve, is preferable to lie within the range of 5% to 40%, both inclusive, relatively to the component inside the particles". The proportion of weight reduction disclosed by the specification does not refer to graphite alone, but refers to the component other than graphite when contained in a mixture of graphite and the component other than graphite.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 and 3-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 3-5 recite the graphite material comprises graphite and a component or material other than graphite, which is indefinite. A graphite material is by definition graphite. It is unclear how a graphite material includes a material that is not graphite. It appears the negative electrode graphite material is produced from a material that includes graphite and a non-graphite material. However, this indicates a product-by-process limitation.

Furthermore, claims 1 and 3-5 recite a "weight reduction as measure by DTG and is at least 5% and at most 40%", which is indefinite. It is unclear how the graphite material undergoes a "weight reduction".

In claim 1, "G_s" is not specifically defined. In claims 1, 3 and 4, "the weight reduction" lacks proper antecedent basis.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 and 3-5 are rejected under 35 U.S.C. 102(b)/103(a) as being anticipated by, and alternatively unpatentable over, Hayashi et al., JP 10-334915.

Hayashi teaches a rechargeable battery having an electrode comprising graphite particles. A dynamic energy process is applied to a graphite material so that the apparent density ratio between before and after the process becomes 1.1 or above. The apparent density ratio between before and after the process equals the tap density after the process/tap density before the process, and this is to become the index of sphericity. See abstract.

The intensity ratio R of a Raman spectrum is preferably 0.4 or less. In the Raman spectrum analysis, the intensity IA of peak PA near 1580 cm^{-1} and the intensity IB of peak PB near 1360 cm^{-1} were measured (0035). Therefore, $R=IB/IA=H_{sd}/H_{sg}$ and $H_{sg}/H_{sd}=1/R=G_s$. Since R is 0.4 or less, Hayashi teaches Gs is 2.5 or more.

The tap density ratio before and after processing is 1.7 or greater, more preferably 1.1 or greater. It is desirable to have a tap density after processing of 0.5-2 g/cc (see page 4, paragraph 0023-0024). The tap density of the graphite material is preferably in the range of 0.7-1.2 g/cc (see page 7, paragraph 0042). The true density of the graphite material is 2.25 g/cc or more (claim 2). Thus a packing characteristic index (tap density/true density) of Hayashi may be 0.53 (1.2/2.25 =tap density/true density).

The specific surface area of the graphite particles after processing (pulverizing) is below 25 m^2/g and more than 0.5 m^2/g, preferably 2-10 m^2/g (0035). Table 4 shows different graphite material properties before and after a dynamic energy process/treatment. The SA in Table 4 represents surface area with the surface area of the graphite being 19.1 m^2/g before treatment and

8.9 m^2/g after treatment (Example 13). The surface area after treatment is 2.1 times that before treatment. The energy process is specifically pulverization. Hayashi teaches a surface area of the graphite being 4.5 m^2/g, 4.8 m^2/g, 8.7 m^2/g or 19.1 m^2/g before treatment (Table 4) and preferably 2-10 m^2/g after treatment (0035). Hayashi teaches an electrode having a graphite material with a (d002) distance between layers of 0.34nm or less (claim 2).

Hayashi teaches natural graphite of high orientation/high crystallinity is used (0013-0014). High crystallinity natural graphite is known to have a rhombohedral structure (diamond structure). Hayashi teaches the natural graphite may be subjected to a surface grinding process (0029). Natural graphite has a rhombohedral structure (as stated in the present specification, see above).

Hayashi does not explicitly recite the graphite material has at least two peaks on a differential thermogravimetric curve. However, the graphite material of Hayashi inherently has at least two peaks on a differential thermogravimetric curve because the graphite material of Hayashi has a Raman spectrum having two distinct signal peaks. The two distinct signal peaks on the Raman spectrum indicate the graphite material contains two distinct carbon materials. A graphite material having two distinct carbon materials would inherently provide at least two peaks on a differential thermogravimetric curve.

Thus the claims are anticipated. The claims are alternatively unpatentable. Hayashi does not explicitly state the weight rejection as measured by DTG, is at least 5% and at most 40%. However, the limitation is a product-by-process limitation, which is not given patentable weight in the absence of unexpected results. It appears the component or material other than graphite is removed to produce the claimed negative electrode graphite material.

Response to Arguments

Applicant's arguments filed 6/12/07have been fully considered but they are not persuasive. Applicant argues the claim recitation of a graphite material comprising graphite and a component or material other than graphite is clear because the claim recites "comprises" which is open language and can be read as "includes". Examiner disagrees. Regarding claim 1, the recitation "a negative electrode comprised of a graphite material" indicates the "graphite material" of the claimed invention is present in the produced negative electrode. The recitation "said graphite material is further characterized by a rhombohedral structure, at least two peaks...and the weight reduction...", indicate a graphite material wherein the component or material other than graphite has been removed (the weight reduction as disclosed in the specification). Therefore, the recitation "said graphite material comprises graphite and a component other than graphite" is indefinite because the term "graphite material" cannot be used to describe both 1) a material comprising graphite and a component other than graphite and 2) a graphite material wherein a component other than graphite has been removed. Furthermore, Applicant asserts the situation is similar to claiming any alloy but reciting its most common component as an adjective describing it (for example, aluminum alloy). However, the alloy example is not applicable to the present rejection of claim 1 and 3-5 as indefinite because while an aluminum alloy material is still considered an alloy by one of skill, a non-graphite material would clearly not be considered a graphite material by one of skill in the art.

Applicant argues Hayashi fails to teach "the weight reduction as measured by DTG is at least 5% and at most 40%" as required by the claimed invention. However, the limitation is a product-by-process limitation, which is not given patentable weight in the absence of unexpected

results. It appears the component other than graphite is removed to produce the claimed negative electrode graphite material. Applicant has not addressed this argument.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

August 13, 2007

TRACY DOVE
PRIMARY EXAMINER